

Oregon Department of Agriculture
Noxious Weed Pest Risk Assessment for
Butterfly Bush
Buddleja davidii
Buddlejaceae
Febraury 2004, Revised March 2016

Findings of Review and Assessment: Butterfly bush meets the criteria of a B Listed Noxious Weed as defined by the ODA Noxious Weed Policy and Classification System. This determination is based on two independent risk assessments, a review of the literature and from information obtained from a 2003 distribution survey of Oregon. Using a rating system as outlined by the USDA-APHIS Weed Risk Assessment Guidelines, butterfly bush received a medium score of 43 points out of a total potential score of 89. Using the ODA Noxious Weed Rating System, butterfly bush also received a moderate score of 13 indicating a B listing.

Introduction: Butterfly bush is a widely popular ornamental species prized for its showy flowers, fast growth, and ability to thrive in poor soils. *Buddleja davidii* is one of 100 butterfly bush species found worldwide and one of 40 *Buddleja* species native to China (Anisko 2001). A wide range of commercial cultivars is available offering white, purple, pink, and violet to near blue colors; all are highly attractive butterfly species prized by gardeners. Butterfly bush was introduced into Great Britain at the end of the 19th Century (Owen 1980). By the middle of the 20th, it was already reported as being thoroughly naturalized in wastelands in southern England. Today, it is ranked as one of the top 20 weeds in Great Britain. It is also a problem of forestlands in New Zealand (Richardson et.al.1996). Much of western Oregon timberlands and right of ways are available for invasion should no action be taken to control the species. It is a plant that requires well-drained soil for success.



Butterfly bush flower

Reproduction: Butterfly bush is a hardy deciduous perennial shrub growing to 10 feet tall and adorned with lilac-like flowers appearing from mid to late summer. It is a prolific seed producer with some plants capable of producing up to one million seeds (Miller 1984). The seeds are extremely small, lightweight and capable of being dispersed by multiple factors such as wind, water, animals, and human activities. Leaves are narrow, arranged opposite on the stems and are green to blue-gray in color.

Factors Effecting Establishment: Seedlings may require prolonged periods of wetness to establish, but they also display drought tolerance and germinate well in coarse soils (Miller 1984). Very early growth is slow, enabling competing vegetation to outpace butterfly bush seedlings, making this plant a poor competitor during early growth stages. Once established though, growth rates of butterfly bush quickly surpass that of most native vegetation. Mature plants can be quite drought tolerant and survive on dry soils during periods of drought stress. Butterfly bush, a pioneering species, dominates open and disturbed habitats (Clay 2001). In Oregon, this behavior is most clearly seen along roadsides, abandoned industrial areas, railroad right-of-ways, gravel bars, and logged over forestlands. Observations indicate that butterfly bush proliferates at disturbed sites and may require human or natural disturbance for establishment and persistence. Buddleja is a prolific seeder though seeds are not long-lived. Establishment of seedlings depends on disturbed or open ground. There are no biological controls impacting the plant and no grazers. Soil type and adequate moisture are the primary factors that improve survival. Illegal plant dumping and transport of mature plant material are the primary mechanism of human-based dispersal. Flood events and wildlife are the main natural dispersers.

Probability of Detection: Butterfly bush is a large showy plant and easily recognized by all.

Distribution in Oregon: The west coast of North American, eastern seaboard states, and parts of the Midwest host escaped populations of Buddleja. In Oregon, ODA completed a survey for butterfly bush in 2003. The survey showed regional concentrations in the Portland area, on the Clackamas and Sandy Rivers, in Lane County, in Coos County and on islands in the Rogue River in Josephine County. Additional small sites are found on coastal highways and along many roads in the Willamette Valley. Currently, there are no reports of escaped infestations from any county east of the Cascades.

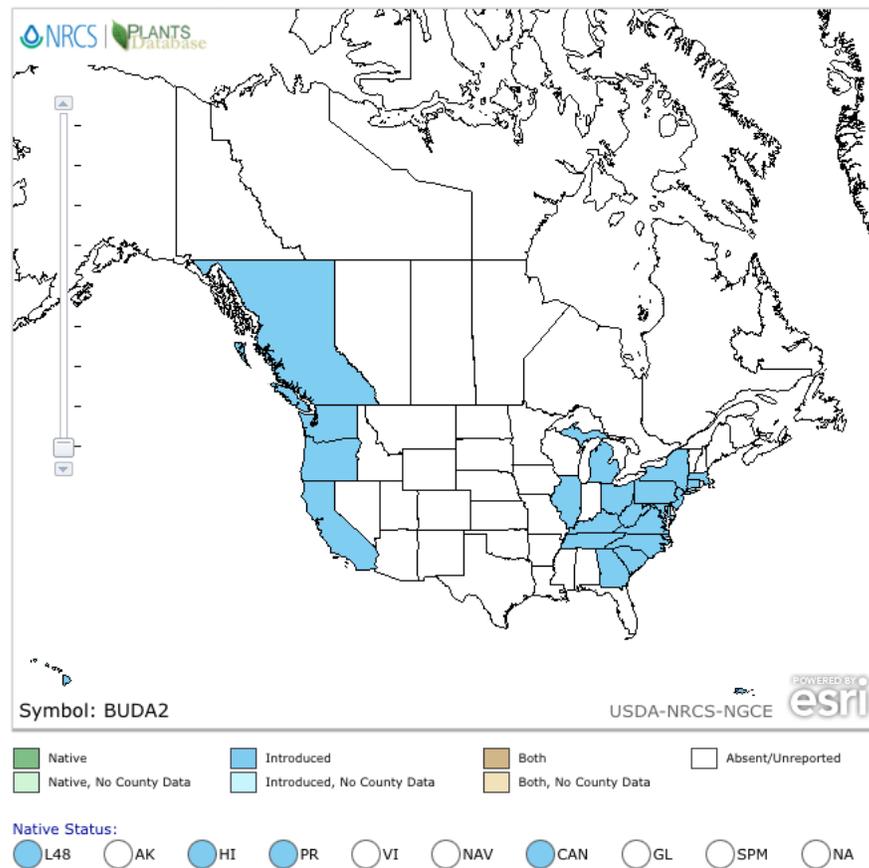
Environmental Impacts: Impacts due to plant competition along riverine systems seems to have waned as native vegetation has outcompeted Buddleja except in locations where significant disturbance has occurred. Significant invasion into seasonally dry meadows and openings has not been a problem which can be attributed to lack of Buddleja in yard debris dumps on public lands. The 1990's saw a rapid increase in escaped populations of butterfly bush following its rise in popularity as a garden ornamental nationwide. This rapid rise in also led to an awareness of emerging problems. Foresters have reported problems with butterfly bush invading SW Oregon timberlands after timber has been harvested. Forestry impacts include increased costs of tree establishment and higher tree mortality due to competition. In New Zealand, it has been determined that butterfly bush causes more mortality to radiata pine seedlings than brooms, gorse and other selected weeds. (Richardson 1996). Right of ways is very susceptible to invasion as the gravelly substrate and reduced grass competition creates the perfect seedbed. Riverine gravel bars freshly scoured by flooding are quickly colonized by Buddleja though this may not be a problem due to the transitory nature of the habitat.

Butterfly bush control on rights-of-way is problematic due to the plants ability to withstand both mechanical and herbicide treatments. Multi-year treatments on the same infestations are commonplace in England to control regrowth (Clay 2001). Maintaining line-of-sight clearance can be expected to be more problematic because of butterfly bush's positive response to mowing.

The negative impacts to native flora and fauna are less clear. As an invader of open rocky substrates and waste areas, butterfly bush may actually provide food, cover, shade and a significant nectar source to areas devoid of vegetation. For example, larval feeding by 11 native butterfly species has been documented on butterfly bush in England. (Owen1980). In New Zealand, butterfly bush research determined that the species quickly colonizes and out-competes native plants on gravel bars and alluvial deposits and encouraged a more rapid succession towards forest tree species than allowed by native brush species (Smale 1990). This process of tree succession is clearly evident at infestations in the Salmon Creek drainage of Lane County. If current trends continue, it should be expected that butterfly bush would be found in most major watersheds in western Oregon, behaving much like Scotch broom where suitable habitat is available.

Economic Impacts: Negative impacts include minor additional costs to right-of-way maintenance activities, sporadic additional costs to tree producers on commercial timberlands. *Buddleja davidii* was a popular and profitable plant to the industry before listing. Today, only sterile hybrids are available on the market in Oregon but don't appear to have captured the attention of gardeners as the old varieties did.

Control: Butterfly bush can be controlled by cutting and stump treating with herbicides, by foliar applications or by cutting and removal of stumps. Later in the summer season during dry conditions, herbicide treatment success can be poor. Removing larger stands can be very labor intensive.



US distribution of butterfly bush

Noxious Weed Qualitative Risk Assessment 3.8
Oregon Department of Agriculture

Common Name: Butterfly bush
Scientific Name: *Buddleja davidii*
Family: Buddlejaceae

For use with plant species that occur or may occur in Oregon to determine their potential to become serious noxious weeds. For each of the following categories, select the number that best applies. Numerical values are weighted to increase priority categories over less important ones. Choose the best number that applies, intermediate scores can be used.

Total Score: 43 Risk Category: B

GEOGRAPHICAL INFORMATION

- 1) **Invasive in Other Areas**
0 Low- not known to be invasive elsewhere.
2 Known to be invasive in climates dissimilar to Oregon's current climates.
6 Known to be invasive in geographically similar areas.
Comments: Known to be invasive in geographically similar areas.
- 2) **Habitat Availability:** Are there susceptible habitats for this species and how common or widespread are they in Oregon?
1 *Low* – Habitat is very limited, usually restricted to a small watershed or part of a watershed (e.g., tree fern in southern Curry County).
3 *Medium* – Habitat encompasses 1/4 or less of Oregon (e.g., oak woodlands, coastal dunes, eastern Oregon wetlands, Columbia Gorge).
6 *High* – Habitat covers large regions or multiple counties, or is limited to a few locations of high economic or ecological value (e.g., threatened and endangered species habitat).
Comments: Habitat covers much of western Oregon.
- 3) **Proximity to Oregon:** What is the current distribution of the species?
0 *Present* – Occurs within Oregon.
1 *Distant* – Occurs only in distant US regions or foreign countries.
3 *Regional* – Occurs in Western regions of US but not adjacent to Oregon border.
6 *Adjacent* – Weedy populations occur adjacent (<50 miles) to Oregon border.
Comments: Occurs within Oregon.
- 4) **Current Distribution:** What is the current distribution of escaped populations in Oregon?
0 *Not present* – Not known to occur in Oregon.
1 *Widespread* – Throughout much of Oregon (e.g., cheatgrass).
5 *Regional* – Abundant (i.e., occurs in eastern, western, central, coastal, areas of Oregon) (e.g., gorse, tansy ragwort).
10 *Limited* – Limited to one or a few infestations in state (e.g., kudzu).
Comments: Regionally abundant.

BIOLOGICAL INFORMATION

- 5) **2** **Environmental Factors:** Do abiotic (non-living) factors in the environment effect establishment and spread of the species? (e.g., precipitation, drought, temperature, nutrient availability, soil type, slope, aspect, soil moisture, standing or moving water).
- 1 *Low* – Severely confined by abiotic factors.
 - 2 *Medium* – Moderately confined by environmental factors
 - 4 *High* – Highly adapted to a variety of environmental conditions (e.g., tansy ragwort, Scotch broom).

Comments: Moderately confined by environmental factors.

- 6) **3** **Reproductive Traits:** How does this species reproduce? Traits that may allow rapid population increase both on and off site.
- 0 *Negligible* – Not self-fertile, or is dioecious and opposite sex not present.
 - 1 *Low* – Reproduction is only by seed, produces few seeds, or seed viability and longevity are low.
 - 3 *Medium* – Reproduction is vegetative (e.g., by root fragments, rhizomes, bulbs, stolons).
 - 3 *Medium* – Produces many seeds, and/or seeds of short longevity (< 5 years).
 - 5 *High* – Produces many seeds and/or seeds of moderate longevity (5-10 years) (e.g., tansy ragwort).
 - 6 *Very high* – Has two or more reproductive traits (e.g., seeds are long-lived >10 years and spreads by rhizomes).

Comments: Produces many seeds, and/or seeds of short longevity (< 5 years).

- 7) **4** **Biological Factors:** Do biotic (living) factors restrict or aid establishment and spread of the species? (What is the interaction of plant competition, natural enemies, native herbivores, pollinators, and pathogens with species?)
- 0 *Negligible* – Host plant not present for parasitic species.
 - 1 *Low* – Biotic factors highly suppress reproduction or heavily damage plant for an extended period (e.g., biocontrol agent on tansy ragwort).
 - 2 *Medium* – Biotic factors partially restrict or moderately impact growth and reproduction, impacts sporadic or short-lived.
 - 4 *High* – Few biotic interactions restrict growth and reproduction. Species expresses full growth and reproductive potential.

Comments: Species expresses full growth and reproductive potential.

- 8) **4** **Reproductive Potential and Spread After Establishment - Non-human Factors:**
How well can the species spread by natural means?
- 0 *Negligible* – No potential for natural spread in Oregon (e.g., ornamental plants outside of climate zone).
 - 1 *Low* – Low potential for local spread within a year, has moderate reproductive potential or some mobility of propagules (e.g., propagules transported locally by animals, water movement in lakes or ponds, not wind blown).
 - 3 *Medium* - Moderate potential for natural spread with either high reproductive potential or highly mobile propagules (e.g., propagules spread by moving water, or dispersed over longer distances by animals) (e.g., perennial pepperweed).

- 5 *High* – Potential for rapid natural spread throughout the susceptible range, high reproductive capacity and highly mobile propagules. Seeds are wind dispersed over large areas (e.g., rush skeletonweed).

Comments: Seeds can be wind, water dispersed or by animals.

- 9) **5** **Potential of Species to be Spread by Humans.** What human activities contribute to spread of species? Examples include: interstate or international commerce; contaminated commodities; packing materials or products; vehicles, boats, or equipment movement; logging or farming; road maintenance; intentional introductions of ornamental and horticultural species, or biofuel production.
- 1 *Low* – Potential for introduction or movement minimal (e.g., species not traded or sold, or species not found in agricultural commodities, gravel or other commercial products).
- 3 *Medium* – Potential for introduction or off-site movement moderate (e.g., not widely propagated, not highly popular, with limited market potential; may be a localized contaminant of gravel, landscape products, or other commercial products) (e.g., lesser celandine, Canada thistle).
- 5 *High* – Potential to be introduced or moved within state high (e.g., species widely propagated and sold; propagules common contaminant of agricultural commodities or commercial products; high potential for movement by contaminated vehicles and equipment, or by recreational activities) (e.g., butterfly bush, spotted knapweed, Eurasian watermilfoil).

Comments: Some human movement by yard debris dumping and transport. Weedy varieties not available for sale in Oregon.

IMPACT INFORMATION

- 10) **1** **Economic Impact:** What impact does/can the species have on Oregon’s agriculture and economy?
- 0 *Negligible* – Causes few, if any, economic impacts.
- 1 *Low* - Potential to, or causes low economic impact to agriculture; may impact urban areas (e.g., puncture vine, pokeweed).
- 5 *Medium* – Potential to, or causes moderate impacts to urban areas, right-of-way maintenance, property values, recreational activities, reduces rangeland productivity (e.g., English ivy, Himalayan blackberry, cheatgrass).
- 10 *High* – Potential to, or causes high impacts in agricultural, livestock, fisheries, or timber production by reducing yield, commodity value, or increasing production costs (e.g., gorse, rush skeleton weed, leafy spurge).

Comments: Economic impact slight.

- 11) **1** **Environmental Impact:** What risks or harm to the environment does this species pose? Plant may cause negative impacts on ecosystem function, structure, and biodiversity of plant or fish and wildlife habitat; may put desired species at risk.
- 0 *Negligible* – None of the above impacts probable.
- 1 *Low* – Can or does cause few or minor environmental impacts, or impacts occur in degraded or highly disturbed habitats.
- 4 *Medium* – Species can or does cause moderate impacts in less critical habitats (e.g., urban areas, sagebrush/ juniper stands).
- 6 *High* – Species can or does cause significant impacts in several of the above categories. Plant causes severe impacts to limited or priority habitats (e.g., aquatic, riparian zones, salt marsh; or T&E species sites).

Comments: Impacts limited to disturbed sites, right of ways or industrial areas.

- 12) 0 **Impact on Health:** What is the impact of this species on human, animal, and livestock health? (e.g., poisonous if ingested, contact dermatitis, acute and chronic toxicity to livestock, toxic sap, injurious spines or prickles, causes allergy symptoms).
- 0 *Negligible* – Has no impact on human or animal health.
 - 2 *Low* – May cause minor health problems of short duration, minor allergy symptoms (e.g., leafy spurge).
 - 4 *Medium* – May cause severe allergy problems, death or severe health problems through chronic toxicity, spines or toxic sap may cause significant injury. (e.g., giant hogweed, tansy ragwort).
 - 6 *High* – Causes death from ingestion of small amounts, acute toxicity (e.g. poison hemlock).

Comments: No impact on health.

CONTROL INFORMATION

- 13) 3 **Probability of Detection at Point of Introduction:** How likely is detection of species after introduction and naturalization in Oregon?
- 1 *Low* – Grows where probability of early detection is high, showy and easily recognized by public; access to habitat not restricted (e.g., giant hogweed).
 - 5 *Medium* – Easily identified by weed professionals, ranchers, botanists; some survey and detection infrastructure in place. General public may not recognize or report species (e.g., leafy spurge).
 - 10 *High* – Probability of initial detection by weed professionals low. Plant shape and form obscure, not showy for much of growing season, introduction probable at remote locations with limited access (e.g., weedy grasses, hawkweeds, skeletonweed).

Comments: Easily detected by most individuals.

- 14) 3 **Control Efficacy:** What level of control of this species can be expected with proper timing, herbicides, equipment, and biological control agents?
- 1 *Negligible* – Easily controlled by common non-chemical control measures (e.g., mowing, tillage, pulling, and cutting; biocontrol is very effective at reducing seed production and plant density) (e.g., tansy ragwort).
 - 2 *Low* – Somewhat difficult to control, generally requires herbicide treatment (e.g., mechanical control measures effective at preventing flowering and but not reducing plant density; herbicide applications provide a high rate of control in a single application; biocontrol provides partial control).
 - 4 *Medium* – Treatment options marginally effective or costly. Tillage and mowing increase plant density (e.g., causes tillering, rapid regrowth, spread from root fragments). Chemical control is marginally effective. Crop damage occurs or significant non-target impacts result from maximum control rates. Biocontrol agents ineffective.
 - 6 *High* – No effective treatments known or control costs very expensive. Species may occur in large water bodies or river systems where containment and complete control are not achievable. Political or legal issues may prevent effective control.

Comments: Treatment is more expensive or may require repeat applications. Cutting labor intensive.

Category Scores:

17 Geographic score (Add scores 1-4)

18 Biological Score (Add lines 5-9)

2 Impact Score (Add lines 10-12)

6 Control Score (Add Lines 13-14)

43 Total Score (Add scores 1-14 and list on front of form)

Risk Category: 55-89 = A 24-54 = B < 24 = unlisted.

This Risk Assessment was modified by ODA from the USDA-APHIS Risk Assessment for the introduction of new plant species.

V3.8 2/19/2016

Oregon Department of Agriculture
Noxious Weed Rating System

Common Name: Butterfly bush

Scientific Name: *Buddleja davidii*

Point Total: **13**

Rating: **B**

1) Detrimental Effects: Check all that apply, add number of checks

- 1. *Health*: causes poisoning or injury to humans or animals
- 2. *Competition*: strongly competitive with crops, forage, or native flora
- 3. *Host*: host of pathogens and/or pests of crops or forage
- 4. *Contamination*: causes economic loss as a contaminate in seeds and/or feeds
- 5. *Interference*: interferes with recreation, transportation, harvest, land value, or wildlife and livestock movement

2) Reproduction & Capacity for Spread: Check the number that best describes, enter that number

- 1. Few seeds, not wind blown, spreads slowly
- 2. Many seeds, slow spread
- 3. Many seeds, spreads quickly by vehicles or animals
- 4. Windblown seed, or spreading rhizomes, or water borne
- 5. Many wind-blown seeds, high seed longevity, spreading rhizomes, perennials

3) Difficulty to Control: Check the number that best describes, enter that number

- 1. Easily controlled with tillage or by competitive plants
- 2. Requires moderate control, tillage, competition or herbicides
- 3. Herbicides generally required, or intensive management practices
- 4. Intensive management generally gives marginal control
- 5. No management works well, spreading out of control

4) Distribution: Check the number that best describes, enter that number

- 1. Widely distributed throughout the state in susceptible habitat
- 2. Regionally abundant, 5 or more counties, more than 1/2 of a county
- 3. Abundant throughout 1- 4 counties, or 1/4 of a county, or several watersheds
- 4. Contained in only 1 watershed, or less than 5 square miles gross infestation
- 5. Isolated infestation less than 640 acres, more than 10 acres

5) Ecological Impact: Check the number that best describes, enter that number

- 1. Occurs in most disturbed habitats with little competition
- 2. Occurs in disturbed habitats with competition
- 3. Invades undisturbed habitats and crowds out native species
- 4. Invades restricted habitats (i.e. riparian) and crowds out native species

13

TOTAL POINTS

Note: Noxious weeds are non-native plants with scores of 11 points or higher. Any plants in 4.1, 4.2, and 4.3 should not be classified as “A” rated weeds. Ratings: 16+ = A, 15 – 11= B
ODA Weed Rating System 2/22/16 V3.8

References:

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USDA-NRCS, Plants National Database, <http://plants.usda.gov/>

Reported by: Glenn Miller, ODA

US Plant Hardiness Zone, <http://planthardiness.ars.usda.gov/PHZMWeb/>

